

## Energy Future System Operator Consultation – Regen/ESN response

September 2021

**1. Do you agree that net zero will create the need for new technical roles in the electricity and gas systems, and require a new approach to energy system governance?**

Please see response to question 2

**2. Do you agree that the establishment of a Future System Operator is needed to fulfil the kinds of technical roles needed to drive net zero?**

National Grid Electricity System Operator (ESO) is an integral cog in the GB energy system. The ESO has made important progress in recent years in enabling the decarbonisation of the power system. The ESO insight into the energy system and what it will take to transition to a high renewable system makes it well placed to evolve to take on additional leadership roles.

There is currently an absence of a high-level body overseeing and planning the energy system, taking leadership on decarbonisation and looking out of silos and across all energy vectors. Areas such as the offshore transmission network, conflicting locational signals and heat decarbonisation are examples of issues that would benefit from a system architect. The ESO is the right organisation to take on such responsibilities, developing its role as a system architect and taking strategic decisions in areas such as:

- Formally making carbon a factor in decision-making processes, including dispatch, market design, contract awards and code modifications
- Clearer coordination of locational signals to the generation and demand customers

**5. What issues are there with existing institutional arrangements in the UK energy system in relation to system-wide decision-making and planning?**

Please see response to question 6

**6. What examples/case studies are you aware of where net zero delivery in one part of the energy system did not adequately account for cross-system impacts or costs?**

There is currently an absence of a high-level body overseeing and planning the energy system, taking leadership on decarbonisation and looking out of silos and across all energy vectors. Areas such as the offshore transmission network, conflicting locational signals and heat decarbonisation are examples of issues that would benefit from a system architect. The ESO is the right organisation to take on such responsibilities, developing its role as a system architect and taking strategic decisions in areas we outline in question 7.

### Existing inefficiencies caused by lack of system planning

- 1. Offshore wind networks.** The buildout of offshore transmission networks has been piecemeal and project specific. For several reasons, a joined-up approach has not been taken and although the government and Ofgem are now taking steps to address this issue, which is welcome, the efficiencies that could have been more from a co-ordinated approach at the outset will be lost. A body with responsibility for overall system oversight and planning would be able to ensure that more co-ordinated approaches are taken to system planning from now on and learn lessons in other areas of the network.
- 2. Conflicting locational signals.** There are several factors at present that are incentivising location, often providing contradictory signals:

- 2.1. Network charges and connection costs.** The huge programme of reform that is being undertaken right now is Ofgem's primary means of incentivising location of future assets. Ofgem, taking this narrow view of locational signals on the network, misses the myriad of factors that can be influential in choosing location of a renewable or flexible asset.
- 2.2. Transmission charges (TNUoS) in Scotland.** There are currently significant disincentives to storage assets being built in locations where they can address constraints. TNUoS generator charges are one of these barriers, and are unjustified as certain elements of the charges do not reflect the behaviour of storage assets and potential benefits to the system. TNUoS generator charges strongly incentivise distribution-connected storage in the south of England over transmission-connected storage in the north of England and Scotland. The effect of this is clear from the pipeline of projects entering the Capacity Market.
- 2.3. Market incentives.** Increasingly, ESO markets are taking on a locational element to solve various constraint and other technical issues facing the system, for example through their pathfinder projects looking at constraint management, inertia and voltage. Intraday balancing actions taken by the ESO to address constraints can also have a locational element and this is encouraging flexibility developers, including dispatchable thermal generators, to target developments around boundary constraints.
- 2.4. Business rates.** Taking in multiple factors, rates can include land costs and so are variable in terms of location.
- 2.5. Land costs/availability.** Similarly, the cost and availability of land itself will be a significant factor in a development decision.
- 2.6. Planning.** The treatment of renewable and flexible assets in the planning regime varies significantly by devolved authorities and by planning authorities. For example, in 2020, 730 MW of onshore wind went into the planning pipeline in Scotland compared to 4 MW in England. The difference in approach here is striking and sends a clear locational signal to the market.
- 3. Planning for heat and building decarbonisation**
  - 3.1.** Although the key problem with heat and building decarbonisation at present is a lack of government direction, there is also an issue of future planning across multiple vectors to enable a phased, efficient roll out of heat decarbonisation.
  - 3.2.** Heat solutions will not be the same across all households or across all locations. Heat pumps, electric, hydrogen, biofuels and heat networks are just some of the options available, many of which will be predicated on decisions by the local authority, energy networks, or industrial development (e.g. hydrogen clusters).
  - 3.3.** As local areas start to develop local area energy plans, heat solutions are being developed inefficiently without reference to the whole system context.
  - 3.4.** A national picture of where particular heat decarbonisation solutions will be appropriate will be vital to ground those plans in reality and incorporate them into the whole system plan.

## 7. Where should government focus in our efforts to improve systems thinking and coordination across the energy system?

The ESO in its current form has an in-depth, intricate knowledge of the energy system and how it functions. Day-to-day balancing and dispatch as well as longer-term planning has made the ESO the foremost expert in how the GB system runs and what the impacts of decarbonisation will be. As the consultation recognises, there is currently a gap in decision making and strategic direction setting for the energy system – the ESO, with its functional knowledge of the energy system, is well placed to take on some of these roles.

Whole system planning, across multiple energy vectors, is a vital step for ensuring the GB system gets to net zero in a way that maintains system security, keeps costs at the optimal level, and allows a just transition across all areas of Great Britain and across all types of energy consumers.

Examples of this increased whole system decision-making role, could include:

- **Formally making carbon a factor in decision-making processes, including dispatch, market design, contract awards and code modifications.** Currently, the ESO's licence conditions do not allow it to make decisions based on fuel type, letting the market put forward solutions, whether they are low carbon or not. The ESO's ambition to run a net zero carbon system by 2025 is predicated on the market providing zero carbon electricity. The debate about how to make carbon a core consideration in decisions is one that is regularly raised by the industry and by our membership (see [Regen's 2020 paper on this subject](#)), as well as being the subject of an important exploratory piece of work by the BEIS Smart Systems team. This work by BEIS was a welcome development and we would like to see it continued, particularly exploring how this would affect the ESO's decisions.
- **Allowing the FSO to make clearer requirements for locational developments.** There are currently many conflicting signals for developers when deciding where to locate assets – network and connection charges, different planning regimes, varying tax treatment and land costs, and different experiences across DNOs. This creates distortions in the development of assets, as well as decisions about where to build network infrastructure. Many of these issues could be addressed by the FSO having a greater system planning function, but it would also need to be able to take decisions as to where development is or isn't appropriate. It should also have a role in raising the problem with the various bodies responsible for sending conflicting signals (HM Treasury, MHCLG, local authorities, devolved administrations, DNOs, Ofgem).
- **Clearer remit to instruct the Transmission Operators (TO) to build infrastructure where required.** Currently the Network Options Assessment (NOA) process only advises TOs when, where and what to build – TOs are not required to take this advice.

However, the FSO, whether publicly or privately owned, would, and should, be distanced from policy makers. Any decision-making powers therefore need to be carefully considered, with the appropriate checks and balances put in place that ensures those decisions continue to fit within the broader direction of the energy sector. There are some challenges to this, not least that the FSO will be a technical, delivery body that contains a high level of largely unparalleled expertise – this presents a challenge to anybody that scrutinises its plans and performance.

If the FSO does take on a greater system planning function, there will need to be appropriate scrutiny of the plans it puts forward. It will be a challenge to find the balance between giving the FSO the freedom to make decisions as outlined above, while maintaining this scrutiny – finding the right arbiter for this will be challenging, particularly as Ofgem are likely to be an inappropriate body to perform this role in its current form due its lack of clear statutory responsibility for net zero.

Ultimately, the energy sector is lacking broader direction from the current decision-making bodies. There is a temptation to hand these powers to the ESO as it has the right expertise and ambition, however Ministers will continue to have to set high-level direction for the energy system.

**Recommendation: the FSO should take a key decision-making and direction setting role in the energy system**

**11. Do you have views on the proposal for an advisory role? What organisations do you consider would benefit from the provision of advice by the FSO? Who should bear the costs of providing that advice?**

Local decision making is having an increasingly important role in decarbonisation, particularly as the system starts to look across energy vectors and to whole system impacts. Planning and optimising across the whole energy system at a local level will be crucial to decarbonisation. There is currently very little 'place based' expertise in BEIS, Ofgem or the ESO which is a barrier to progress in areas

such as heat decarbonisation and effective EV charging provision. The interface between local energy planning and the central energy system planning will be critical to achieving net zero.

- The FSO will need a clear remit to work with DNOs and local authorities to join up overall system planning with local energy plans. To play this role it will need to develop greater capacity in understanding place-based approaches. For example, some progress is now being made by the ESO in taking insight from the more 'bottom up' Distribution Future Energy Scenarios back into the national Future Energy Scenarios.
- At present, the standard of local planning on energy varies hugely between local authorities and the level of engagement with the relevant actors, including the DNOs, is also undertaken to varying degrees. The FSO could provide support with a clearer framework to local energy planning.
- Responsibility for developing local energy plans and local network plans should, however, be with local authorities and DNOs/DSOs. It is not feasible for a central body to engage effectively with over 400 local authorities and myriad other local bodies.

## 12. Do you have any views on the other areas where we are considering new and enhanced roles and functions for the FSO (outlined in section 3.2)?

### 1. System planning and architecture

We support the roles set out in the consultation for new and enhanced functions in system planning for the FSO. We believe that the stronger role in network planning, described as a future possibility for the FSO, is preferable and should be brought forward in the timeline of the design of the FSO.

An energy system based entirely on renewable generation and flexible assets functions in a fundamentally different way to a fossil fuel-based system and requires more structured planning and controlled implementation. This becomes even more necessary given the urgent timescales for decarbonisation – leaving the markets, with conflicting incentives, to build with little direction will result in an inefficient system with little time left to fix those problems and meet our decarbonisation targets.

Topography, weather patterns and land use restrictions will dictate where generation is sited in a way that was not previously a consideration for fossil fuel generation. The perfect siting of generation with demand centres, while optimal from a system perspective, may not be physically possible or economically optimal. In addition, as multiple energy vectors start to overlap, decisions taken by the relevant responsible parties in silos pose a challenge to the overall management and development of the whole system.

It then becomes very difficult to manage the necessary deployment of generation, flexibility and infrastructure using only market-based incentives, which must be clear enough to show developers where, when and what type of asset to deploy.

We need a body that can provide a long-term, whole system plan for the energy system which is independent from political and commercial motivations. Not only would this create a more efficient system that we are certain is on track for net zero, but also provides certainty and clear signals for developers and investors.

#### 1.2 A system architect role could develop in a number of ways

A broader role in system governance could develop in a number of ways. Specifically, we feel there is a role for a system architect, as explained above. A system architect is often interpreted in different ways – some who remember the days of CEBG have a negative view of central planning. However, in today's system, and one with an urgent and challenging goal of decarbonisation and electrification of other vectors, a national system architect will look very different.

A system architect is a clear **design** function which should complement the roles of system control/operation and co-ordination. The FSO will have some overlaps between design and control/operation which will need to be carefully managed, as they are currently.

There are three stages to system planning and design:

1. Planning for the building of generation and demand ahead of time
2. Planning for network infrastructure to support generation and demand
3. Planning and managing the flexibility and relevant technologies once generation, demand and infrastructure are built

### **1.2.1 Planning for the building of generation and demand ahead of time**

As outlined above, there is a gap of central management for the stage of system planning, other than scenario projections of how much generation *might* be built. A system architect in this role would have a clearer view of how much, what type of, and where generation would be built. This would take into account the multiple (often contradictory) signals given to the market, providing the FSO and other bodies responsible for those decisions to consolidate and remove conflicts. This stage of planning would also take into account the needs of the whole system and how it would need to develop to be ready for heat and transport electrification, among other challenges.

**FES** is the current closest process, but it is only an analysis and extrapolation of build, based on a number of factors. The FES does not influence development directly, nor does it recommend one pathway over another, with one pathway, Steady Progression, still not meeting net zero targets.

To fill the system architect gap, the FES could develop into one core scenario that takes into account various sensitivities, which would then provide a guide to building out generation, infrastructure and flexibility. In order for this planning to have some impact, the FSO would need to take a greater decision-making role – as outlined above.

### **1.2.2 Planning for network infrastructure to support generation and demand**

The current Network Options Assessment (NOA) process is one current route to influencing infrastructure buildout which makes recommendations on transmission network infrastructure investment based on generation and demand projections in the Future Energy Scenarios. However, the NOA process does not recommend for a clear ‘net zero’ scenario, rather following the four FES scenarios, only three of which will meet net zero by 2050.

The NOA only recommends action and investment to transmission network operators, it does not require it, and cannot in its current form. A clearer, more direct decision-making process between the NOA and infrastructure development must be made in order to build the network needed to meet decarbonisation targets.

### **1.2.3 Planning and managing the flexibility and relevant technologies once generation, demand and infrastructure are built**

The NOA looks partly at flexibility needs and can be the initial process for the development of markets meet those needs. This has been a positive process for the most part, but is known to be particularly slow and makes it difficult for flexibility developers to plan ahead for future revenue streams.

An improved system architect role would take into account the whole system needs, generation, demand and infrastructure development, and make a stronger projection and assessment of the amount of flexibility needed and what sorts of technology are needed to provide. Currently no central body is planning for flexibility in any great depth, and there is a clear role for the FSO to take on this function.

The whole system role of the FSO becomes especially important in this role, looking at the potential areas for development of hydrogen, carbon capture and storage, and larger scale energy storage facilities.



### 1.3 Increased responsibilities require greater scrutiny

With an increased role in planning and designing the system, the scrutiny and accountability of the FSO should increase accordingly. Whilst there will be some decision-making powers for the FSO around system design, there must be higher level scrutiny and potentially approval of those plans to ensure they are in line with broader energy policy. The right body to perform this role will be a difficult decision – Ofgem currently does not have a net zero policy compatible with the remit planned for the FSO and would not have the view across other systems such as transport. The Climate Change Committee or National Infrastructure Commission may be suitable bodies with the correct remit and expertise.

In deciding the extent of the system planning remit, the right balance must be set between a prescriptive plan which could stifle innovation, and a vague plan which gives little direction to industry and results in inefficiencies.

**Recommendation: the FSO should take a stronger role in system planning, this enhanced role could be developed prior to legislative changes to the ownership and governance of the ESO**

## 2. DSO/FSO interface

The link between the ESO and DNOs is vital for efficient system planning and decarbonisation and will be even more important if the FSO increases its role in system planning. The following considerations will need to be made in order to optimise the interface between the FSO and DNO/DSOs.

### Variation between DNOs

DNOs all complete Distribution Future Energy Scenarios (DFES) and have requirements to engage with local authorities and other local actors, but the approach across DNOs does vary. If the FSO becomes more involved with DNO/DSO functions and with local actors, then it would need a clear set of standards and structure for that engagement in order to be involved in areas where it's needed and take a step back when it's not.

### Whole system considerations

- The FSO's whole system focus will require a similar remit for DSOs and clear links to that remit in order to ensure a truly whole system approach. DNOs are already going some way to improving their whole system approach so it would be efficient to ensure those two approaches are aligned as soon as possible.
- The FSO's system planning should be able to identify and address potential issues and conflicts arising across distribution or local authority boundaries – local authorities and devolved administrations will be relatively narrowly focussed on their own area plans, with some consideration of national or other areas (although this needs to improve). DNOs only have a limited ability to flag and address issues beyond their own networks, so an important role for the FSO will be to take into account any conflicts, dependencies or indirect effects of particular local decisions.

### Duplication

There is an obvious consideration about the overlaps between work of the FSO and DSOs. While this will become clear as the FSO's role is developed, a clear concern should be to avoid duplication.

**13. What are your views on our proposed characteristics and attributes of a future system operator and how the models presented would deliver against them? Are there other characteristics or attributes that we have not yet considered?**

The consultation sets out clearly that this change is taking place largely to drive decarbonisation in the energy sector. This is a welcome shift in prioritisation and we agree with many of the comments made regarding the net zero remit – it is imperative that the FSO must have a strong, clear remit for net zero in order to enable many of the changes laid out in the consultation and in this response.

The balance between consumer cost and security of supply is clearly a key consideration, but we believe that weighting should fall on decarbonisation. It should be achieved at an efficient and optimal cost, but it needs to be recognised that this might not be the cheapest option for current consumers – it is the responsibility of other areas of government, not the system operator, to ensure that those costs fall on the right sections of society. Costs of climate change and the impact on future consumers should be recognised alongside current cost considerations.

We have some concerns that the consultation is taking a similar approach to Ofgem’s distorted remit, which forces Ofgem into making decisions that, while in the interests of current consumers, are not in the best interests of decarbonisation or future consumers – this has been well documented by the industry and there is a long-standing campaign to change Ofgem’s remit.

If the FSO is to have a prioritised net zero remit, this would create some incompatibility with the regulator. If Ofgem is to approve funding, structure and plans for the FSO, it may reject plans that are not in line with Ofgem’s statutory remit to prioritise consumers, despite those plans meeting the FSO’s net zero remit. This would be very difficult to manage and could result in a stagnation of progress while differences are worked out. This is a clear opportunity to simultaneously change Ofgem’s statutory remit to better reflect decarbonisation and the challenges and costs of climate change – as many in the industry are currently calling for.

If this fundamental shift in the governance and remit of the system operator is to have any significant effect on decarbonisation, this net zero remit must be at its core, with a clear balance between cost and security of supply considerations.

**Recommendation: the FSO must have decarbonisation as its central remit**

**14. Are we considering the right organisation models for the FSO? And why?**

The FSO should be publicly owned. The case for private ownership is limited, given the objectives of this shift away from the TO, in particular the need for owner(s) to be free of energy industry conflicts. It is unlikely that there are many investors who are free of those conflicts and interested in taking on a system operator with the relatively low rate of returns it offers and high levels of responsibility/risk.

Ofgem’s Review of GB energy system operation looked at 13 system operators across the world, of which only two (GB and NI) were privately operated, with two other failed attempts at privatising two public SOs.

System operation is an essential, monopoly public service and one that is crucial in decarbonising our economy and meeting carbon emission targets. Public ownership gives greater control over these two vital aims of delivering energy to consumers and tackling climate change, giving government, and therefore citizens, the ability to scrutinise and keep the FSO on track to deliver these public good outcomes. The for-profit model for private investors, in the context of rising energy bills, is not replicated in comparable system operators across the world and is becoming increasingly unpalatable to consumers footing the bill.

If public ownership is the most likely route, there are several considerations that must be made:

- **Independence.** We agree with the comments made in the consultation document about the need for independence from government departments, ministers and political decisions. A structure that sits too close to government risks getting tied up in budget decisions, reshuffles, machinery of government changes and political upheaval. The remit set for the FSO would need to make clear this independence and split of responsibilities.
- **Accountability.** As well as having accountability to BEIS, Ofgem, CCC and parliament, the FSO could also have some level of accountability to groups not currently represented in the ESO's structure, including industry, consumers and workers. Although energy system interests would need to be managed, it is important that groups are involved that have expertise and knowledge of how the energy industry works and how the system operator should run.
- **Skills and ambition.** The ESO is currently a well-respected and well-run organisation, staffed by talented people who keep the system running optimally and are driving energy sector ambition to net zero. In moving to a public structure, it must be ensured that those attributes and staff are maintained.
- **Structure.** Whilst Ofgem's Review of GB energy system operation does look at some similar publicly owned bodies, there needs to be a more thorough comparison of existing organisations, understanding the benefits and challenges of various models. These could include Transport for London, Channel 4 and Scottish Water, as well as international examples.

**Recommendation: the FSO should be a publicly-owned body.**

**15. Are we considering the right elements for the FSO's regulatory and accountability frameworks? And why?**

**Accountability.** As well as having accountability to BEIS, Ofgem, CCC and parliament, the FSO could also have some level of accountability to groups not currently represented in the ESO's structure, including industry, consumers and workers. Although energy system interests would need to be managed, it is important that groups are involved that have expertise and knowledge of how the energy industry works and how the system operator should run.

**19. Based on the areas where we are considering new and enhanced roles and functions for the FSO, which of these should be prioritised for development? Please explain why.**

There are several steps laid out in this consultation that the ESO could begin to implement now without waiting for legislation:

- taking on an enhanced system planning role, en route to becoming the system architect (see response to question 12)
- the FSO's whole system focus will require a similar remit for DSOs and clear links to that remit in order to ensure a truly whole system approach. DNOs are already going some way to improving their whole system approach so it would be efficient to ensure those two approaches are aligned as soon as possible.



### About Regen and the Electricity Storage Network

Regen is an independent, not-for-profit centre of expertise in sustainable energy with nearly 20 years' experience in transforming the energy system, and we have extensive experience delivering independent expert advice and market insight on all aspects of sustainable energy delivery.

Regen is also a membership organisation and manages the Electricity Storage Network (ESN) - the UK industry group formed in 2008 dedicated to electricity storage. Regen and the ESN have over 150 members from business, local authority, community energy, clean energy developers, academic institutions, and research organisations across the energy sector.

In particular, we draw our experience from substantial engagement over several years with the system operator and distribution network operators – including a paper on the future governance of the energy system, Energy Networks for the Future, and regular, practical engagement with the ESO to help storage operators access the markets and provide value to the system.

This response is based on this extensive practical experience and input from our members, including two events: a webinar with industry leaders; and a working group with members of the Electricity Storage Network.

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